REMARKS

Interview Statement:

Applicants appreciate the Examiner's courtesy in granting the interview of September 2, 2010 with the undersigned. Applicants' representative explained why using the same PET material does not necessarily result in the same crystallization time, pointing to various passages in the present specification and the working examples. Example 3 (of the invention) and Comparative Example 3 (which Applicants believe is representative of the injection molding product of Schmidt) were reviewed. Applicants' representative argued that the preform of Schmidt made by an injection molding does not meet the claimed crystallization time of not shorter than 300 seconds.

The Examiner commented that (i) the intermediate layer as claimed in claim 1 can be a layer of a gas-barrier resin or a recycled polyester resin. However, test data in Table 1 of the specification is given only for a laminate including a recycled polyester resin. The Examiner questioned whether a crystallization time of not shorter than 300 seconds would also be obtained for any one of the various gas-barrier resins encompassed by claim 1. Further, the Examiner questioned (ii) whether the limitation "a time not shorter than 300 seconds" applies to the entire laminate or just to the PET layer. Lastly, the Examiner suggested that Applicants tie the property urged as distinguishing over the prior art to use of compression-forming as opposed to injection molding, and also show how the working examples correspond to what is being claimed.

Response to Office Action:

Claims 1-3, 10 and 12 were rejected under 35 U.S.C. § 102(b) as being anticipated by US Patent 5,804,016 to Schmidt et al. Schmidt et al was cited as disclosing a preform meeting each of the structural limitations of the claimed preform. Further, because the inner and outer layers

of the preform of Schmidt et al are PET layers (100% PET), the Examiner considered that Schmidt et al also meets the claimed property regarding time to maximum calorific value of isothermal crystallization.

The rejection should be withdrawn because the injection molded preform of Schmidt et al does not meet the claimed limitation of "a time is not shorter than 300 seconds before a calorific value of isothermal crystallization of said layer of the ethylene terephthalate unit-polyester resin at 210°C reaches a maximum value." This is explained in detail below.

The preform of the invention is one having at least a polyester layer formed by compression-forming, where an *important* feature resides in that the time is not shorter than 300 seconds before a calorific value of isothermal crystallization of the polyester layer at 210°C reaches a maximum value (page 4, lines 24-30 of the specification). Namely, the present invention is based on the discovery that a preform having a favorable crystallization time effectively suppresses thermal deterioration of the resin (page 4, line 35-page 5, line 3 of the specification). Further, by suppressing thermal decomposition, a very decreased amount of acetaldehyde remains in the preform such that a draw blow-formed container obtained therefrom exhibits excellent mechanical strength and flavor-retaining property (page 5, lines 4-18 of the specification).

In contrast, in producing a preform by an injection molding process, the resin resides in the injection-molding machine for extended periods of time so as to account for a cause of deterioration of the resin. In particular, the inherent viscosity and molecular weight of the polyester resin decreases due to the thermal decomposition, making it difficult to obtain satisfactory mechanical strength. Further, acetaldehyde generates during thermal decomposition

of the polyester resin. The acetaldehyde that remains in the polyester deteriorates the flavor-retaining property of a bottle made from the preform (page 2, lines 20-34 of the specification).

As discussed at page 5, lines 27-31 of the specification, the preform of the invention (prepared by compression-forming) exhibits a peak of heat generation due to the crystallization which is broader than a peak of heat generation due to the crystallization of a preform obtained by the injection-forming. In reference to Fig. 1, the time T_1 before the calorific value of the preform of the invention reaches a maximum value is considerably longer than the time T_2 before the calorific value of the preform obtained by the injection-forming reaches a maximum value. From this, it is understood that the crystallization time is considerably longer than that of a preform obtained by injection-forming (page 5, line 31-page 6, line 3).

For example, in a preform "having a time of not longer than 300 seconds before a calorific value of isothermal crystallization of the polyester layer at 210°C reaches a maximum value" as demonstrated in Comparative Example 1 made by injection molding, the amount of the acetaldehyde was 2.9 μg/L. When this preform is biaxially draw blow-formed into a bottle, the container body exhibited low buckling strength, poor mechanical strength and inferior flavor-retaining property (page 6, lines 11-22 of the specification).

To the contrary, in a preform "having a time of not shorter than 300 seconds before a calorific value of isothermal crystallization of the polyester layer at 210°C reaches a maximum value" as demonstrated in Example 1 made by compression forming, the amount of acetaldehyde was 1.9 μg/L which is a substantial decrease in the amount of acetaldehyde remaining as compared to that of Comparative Example 1. When this preform is biaxially draw blow-formed into a bottle, the container body exhibited high buckling strength and excellent flavor-retaining property (page 6, line 23-page 7, line 1 of the specification).

In an ordinary injection-forming machine, the cavity is filled with the resin running through a hot runner and a gate. When the injection-forming machine has the hot runner, however, the residence time of the molten resin increases and the resin tends to be thermally decomposed, thus making it difficult to form the preform having the layer of polyester resin, wherein the time is not shorter than 300 seconds before a calorific value of isothermal crystallization of the layer of the polyester resin at 210°C which is a maximum value (page 12, lines 11-21 of the specification).

In compression-forming, on the other hand, the residence time of the resin is short, and the resin is not thermally deteriorated unlike that of the case of the injection-forming (page 12, lines 22-25 of the specification).

In Example 3 bridging pages 19-20 of the specification, a preform was made by co-extruding inner and outer PET layers sealing a recycled polyester resin intermediate layer and compression-forming the melt-extruded molten resin mass. The preform thus obtained was heated and biaxially draw blow-formed in a metal mold to obtain a bottle. In Comparative Example 3 at page 21, a preform and bottle were formed in the same manner as in Example 3, but using a co-injector molding machine equipped with an injector for forming the inner and outer layers and an injector for forming an intermediate layer. The preform and bottle thus obtained were evaluated with respect to various physical properties as set forth in Table 1 at pages 23-24 of the specification. As shown in Table 1, the preform of Comparative Example 3 had a crystallization time of 277 seconds outside the scope of claim 1 requiring a time not shorter than 300 seconds, whereas the preform of Example 3 had a crystallization time of 480 seconds. Table 1 also shows a substantial difference in the amount of remaining acetaldehyde and compression strength of the resulting bottle.

Turning to the cited prior art, Schmidt et al discloses a multi-layer *injection molded* preform, and has no disclosure as to compression-forming. See, for example, Schmidt et al Fig. 5 (*co-injection* apparatus for making the preform of Fig. 4, at col. 4, lines 20-22); at col. 3, lines 20-22 (layer separation may occur in the preform, immediately following removal from the *injection mold*); at col. 3, lines 63-64 (the present invention includes multi-layer preforms and other *injection-molded* articles); at col. 4, lines 65-66 (according to a first embodiment, an *injection-molded* multi-layer preform and method of making the same are illustrated in Figs. 4-6); at col. 12, line 49 (*injection-molded* preforms); and claims 1 and 18.

As demonstrated in the test data presented in the specification, the multi-layer *injection-molded* preform of Schmidt et al, is not expected to exhibit a crystallization time of not shorter than 300 seconds as required by present claim 1. That is, even though the inner and outer layers of the injection-molded preform of Schmidt et al are PET layers, that does not mean that the PET layers have a crystallization time of not shorter than 300 seconds. This is due to the difference in processing, namely, compression-forming in accordance with the invention as opposed to injection molding as taught by Schmidt et al. In other words, Schmidt et al also does not disclose a preform which would inherently include inner and outer PET layers having a crystallization time of not shorter than 300 seconds as required by present claim 1.

Because Schmidt et al does not meet each of the limitations in claim 1, it is respectfully submitted that claim 1 is not anticipated by Schmidt et al and withdrawal of the foregoing rejection under 35 U.S.C. § 102(b) is respectfully requested.

Request for Rejoinder:

Withdrawn method claim 6 includes all the limitations of product claim 1. If product claim 1 is found to be allowable, Applicants respectfully request rejoinder of withdrawn method claims 6-8 pursuant to MPEP § 821.04.

Reply to Issues Raised by the Examiner:

With respect to (i) above, claims 1 and 6 have been amended to limit the resin constituting the intermediate layer to recycled polyester. That is, "gas-barrier resin" has been deleted. Claim 3 has been canceled.

With respect to (ii) above, claims 1 and 6 have been amended to recite that the crystallization time of the inner and outer layers of the ethylene terephthalate unit-containing polyester resin is not shorter than 300 seconds. Applicants explain as follows.

The crystallization time for the PET layer of claim 1 is for both PETs that constitute the inner layer and the outer layer. In the specification, page 17, lines 29-35, the samples (multi-layers) cut out from the preform and the bottle body portion are measured using DSC. As for the method of measuring the crystallization times in the Examples, the whole PETs in the multi-layer structure are measured, i.e., the PETs of both the inner layer and the outer layer and the recycled PET together are measured using DSC. As a result, exothermic peaks due to the crystallization are detected for the PETs and the recycles PET, respectively. From the properties of the resins, those having longer crystallization times are measured to be PETs. Namely, the recycled PET uses the virgin PET as a starting material, is affected by thermal hysteresis and by impurities and, therefore, has a shorter crystallization time than the virgin PET (when the PET is recycled by the material recycling method, the crystallization time is the same as that of the virgin PET). Therefore, the resin having a longer crystallization time is measured to be the PET.

That is, from the measuring method of Examples, the crystallization time for the PET layer of claim 1 is for both the inner layer and the outer layer.

With respect to (iii) above, by means of the Examples and Comparative Examples, Applicants have shown that the property urged as distinguishing over the prior art, namely, a crystallization time of not shorter than 300 seconds, is tied to the use of compression-forming (invention) as opposed to injection molding (prior art).

Withdrawal of all rejections, rejoinder of method claims 6-8, and allowance of claims 1-3, 6-8 and 10-13 is earnestly solicited.

In the event that the Examiner believes that it may be helpful to advance the prosecution of this application, the Examiner is invited to contact the undersigned at the local Washington, D.C. telephone number indicated below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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